

Pasture Improvement, Cascade County, MT

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July 2021

Objective: Diversify and improve smooth brome pasture

County: Cascade County

Average Annual Precipitation: 14 - 16 inches

MLRA: 52, Brown glaciated plains

Dominant Soil Types: Hilger very stony loam

Elevation: 3447 ft

Site Preparation: Applied glyphosate prior to seeding

Seeding Date: April 26, 2019

Seeding Method: Drill seeded

Acres Seeded: Each species was seeded individually in 0.25 plot.

Previous Site History: Smooth brome and wheatgrass dominated pasture with some weeds present.

Herbicide: Glyphosate (Roundup) applied at 4 qt/ac April 22, 2019; spot weed treatment in 2020

Irrigation: None

Grazing: None in 2019, grazed summer 2020

Monitoring Dates: July 2019, 2020, and 2021



Fig. 1. Seeding with a rangeland drill into glyphosate treated rangeland, April 2019.

Introduction:

The goal of this field planting was to improve and diversify the smooth-brome dominated pasture by adding legumes and other palatable forb species (Table 1). The legumes, cicer milkvetch and sainfoin, provide high quality forage for livestock and wildlife. Small burnet provides excellent forage for livestock and wildlife during all seasons. Forage chicory is not commonly planted in Montana but was tested here because it is highly palatable and similar in nutritional and mineral content to alfalfa or cool-season grasses. The site was not grazed for 18 months after seeding to allow species establishment. There was above average precipitation in 2019 and 2020 followed by below average precipitation in 2021.

Table 1. Seeded species and their seeding rate.

Common Name	Scientific Name	Cultivar	Description	lbs PLS/acre
Small burnet	<i>Sanguisorba minor</i>	Delar	Hardy, long-lived forb, rose family	15
Cicer milkvetch	<i>Astragalus cicer</i>	Lutana	Long-lived, non-bloat legume	8
Sainfoin	<i>Onobrychis viciifolia</i>	Eski	Deep-root, perennial legume	34
Forage chicory ¹	<i>Cichorium intybus</i>	VNS	Deep-root, perennial, sunflower family	3

¹Chicory is a county listed noxious weed in Lincoln County, MT and a declared weed in several WY counties. This species should be closely monitored and not allowed to spread from the site.

Results:

In 2019, the species were slow to establish in the cool, wet, spring weather. By July 2019, all the species had established and forage chicory, sainfoin, and small burnet had over 1.25 plants/ft² but with a low canopy cover (Table 2). Species establishment was patchy throughout the field and may have been a result of competition with the existing plant species on site. The density and height of small burnet, cicer milkvetch, and chicory increased in 2020, and the canopy cover of small burnet and cicer milkvetch increased in 2020. Cicer milkvetch

plants were particularly robust in 2020. The seeded species persisted on the site in 2021, and forage chicory increased in canopy cover. All species were producing flower and spreading on the site. Sainfoin plants were abundant throughout the seeded area but were small stature in 2021.

The 2019 herbicide treatment did a good job of reducing smooth brome and wheatgrass species to allow seeded forbs to establish. Where Roundup was used in the spring, smooth brome decreased from approximately 50% canopy cover to 5% cover. By 2020, smooth brome had recovered on site and was a robust plant. The seeded species were able to persist on the site even with smooth bromes recovery and some weeds present (Table 2). Warm-season grasses were not affected by the herbicide treatment and many native and non-native forbs also remained on the site.

Table 2. Species canopy cover 2019 to 2021, and additional species characteristics in July 2021.

Common Name	Canopy Cover (%)			2021				
	2019	2020	2021	Density (plants/ft ²)	Lush Height (in)	Absolute Height (in)	Seed Production	Brome + Weeds (% cover)
Small burnet	5	10	10	1.5	8	12	Abundant	25
Cicer milkvetch	1	15	15	2.5	8	10	Moderate	30
Sainfoin	10	5	5	1.5	10	16	Sparse	20
Forage chicory	15	15	20	4.0	7	32	Abundant	40



Fig 2. Forage chicory had 20% canopy cover and 4 plants per foot even with competition from smooth brome, July 2021.



Fig 3. Cicer milkvetch increased in density, cover, and height in 2020 and had relatively high density in 2021 even with smooth brome competition.

Summary:

- Drill seeded small burnet, cicer milkvetch and/or forage chicory into glyphosate-treated pasture can establish and increase in density, canopy cover, and/or height over time. These three species can be used to improve the diversity of smooth brome and wheatgrass dominated pastures.
- Sainfoin established on the site but decreased in density, canopy cover, and height as the smooth brome recovered from the herbicide treatment in 2020.
- Forage chicory was spreading on site but has not escaped the seeded area in this arid environment.